

Assisting ONR Littoral Air-Sea Processes DRI

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The PI has proposed to continue contribute to LASP in the post-field data synthesis and observation-model integration. His work is summarized for each of the tasks he proposed.

(a) summarize the mean conditions and variability during the field campaign in comparison to the climatology to provide a weather and climate background for other LASP PIs' data interpretations

This is being accomplished along two lines. First, this PI is working with other PIs to write a CINDY/DYNAMO/AMIE/LASP overview article for BAMS. In this article, the scientific rationale and objective, experimental design, data collection, and selected preliminary results of the field campaign are presented. This article is planned to be submitted to BAMS in November 2012.

Meanwhile, this PI is working with the DYNAMO MJO forecast team to write another article to summarize the atmospheric and oceanic conditions during the field campaign. The summary includes the mean conditions of ENSO, IOD, and the monsoons; monthly mean atmospheric circulation and oceanic equatorial currents and thermocline depth; the MJO; and the equatorial Rossby and Kelvin waves. The purpose of this article is to provide comprehensive information for the field PIs to relate their specific observations to the large-scale atmospheric and ocean mean condition and variability. This article is expected to be submitted in November 2012.

(b) identify periods with specific atmospheric and oceanic events that deserve special attention from LASP PIs for their data processing, interpretation, and case studies.

This has been done in different ways. First, during the Boston LASP workshop, it has been decided that a special case study would be done for the Nov. 24, 2011 onset of the MJO at Reville. This PI is contributing to this case study by providing information of the large-scale variability, especially the MJO surrounding that day.

Second, based on different field observations (Reville XBT survey in September, Mirai XCTD survey in November, and SeaSoar profiles in January), this PI and other PIs have identified a transient behavior of the Seychelle-Chargo Thermocline Ridge (SCTR). This motivated future investigations of possible effects of surface westerly wind bursts of the MJO and oceanic Rossby waves on the SCTR by modeling as well as observations.

Third, the November 2011 MJO event has been identified as the primary MJO case of the field campaign because of its full coverage by all field observations. This event has been selected as the additional case study for existing MJO model intercomparison project (see e).

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(c) organize a special data workshop for LASP and DYNAMO PIs to address issues related to data QC, release, and comparisons.

This workshop has been decided to be at Kona, Hawaii on March 6 – 10, 2013. This PI, as one of the organizers of the workshop, has involved in venue and date selection, soliciting funding support from various agencies (ONR, NOAA, NSF, DOE), which all agreed to contribute. In addition to cover the facility cost, this PI has been negotiating with some agencies to provide travel funds to support student participations. The full workshop agenda is still under development.

(d) coordinate LASP and DYNAMO PIs to create an air-sea integrated data set that cover the multi-scale variability during the entire field campaign.

This has been discussed at the Boston LASP workshop and Seattle DYNAMO radar workshop. We are moving toward this direction. Revelle C-band radar QC has been completed. Mirai C-band radar QC is in progress. QC for Revelle lidar, cloud radar, surface fluxes, upper-ocean profiles, and level 4 soundings are in progress. Once all QC is completed, the next step would be to put these data together and create an integrated atmospheric oceanic time series.

(e) facilitate field and modeling PIs collaboration in observation-modeling integration in terms of modeling simulations of case studies, validations, and parameterization improvement;

This has been accomplished at several fronts. This PI has convinced seven main NPW centers to participate in an assessment of MJO forecast skill during the field campaign. DYNAMO modeling group has decided to make hindcast for the MJO events during the field campaign and joint the skill assessment.

At the pan-GASS workshop in September, this PI suggested the MJO Task Force/GASS MJO Diabatic Heating Profile (MDHP) Project take the advantage of the rich field observations from the DYNAMO field campaign and add the DYNAMO November MJO case in its multiple model comparisons. This suggestion was well accepted. The MDHP Project will make the formal proposal near the end of this year.

The DOE Atmospheric Science Research (ASR) community has made two model comparison projects targeting convective activities during TWP-ICE, including cloud resolving models (CRMs) and global climate models (GCMs). This PI had conversations with the leaders of these project and convinced then to do it again but targeting the DYNAMO MJO events. This will be discussed in detail at the ASR annual science team meeting at the end of October.

A model-observation team has been formed to used the field observations to help the development of global cloud-permitting models (GCPMs) to reduce their biases and errors in tropical cloud and precipitation. This team include main DYNAMO field PIs and modelers who are working on global, regional, and local CPMs.

By the end, we will have a two tier model comparison projects targeting the DYNAMO field periods. One is real-time forecast and hindcast skill assessment. The other is case studies by GCMs, CRMs, and regional models.

One aspect not fully explored is coupled model comparison for two reasons. One is that there are only few coupled models in the planned model comparison projects. The other is that we have not yet had the integrated air-sea data set at Revelle and Mirai, which would be a motivation for more coupled models to participate.

(f) synthesize the main achievement of LASP and DYNAMO in both field observations and modeling activities.

This will be done after the projects described above are underway and near completion. Preliminary results from the field observations are compiled based on presentations from the PIs at several conferences and workshops.